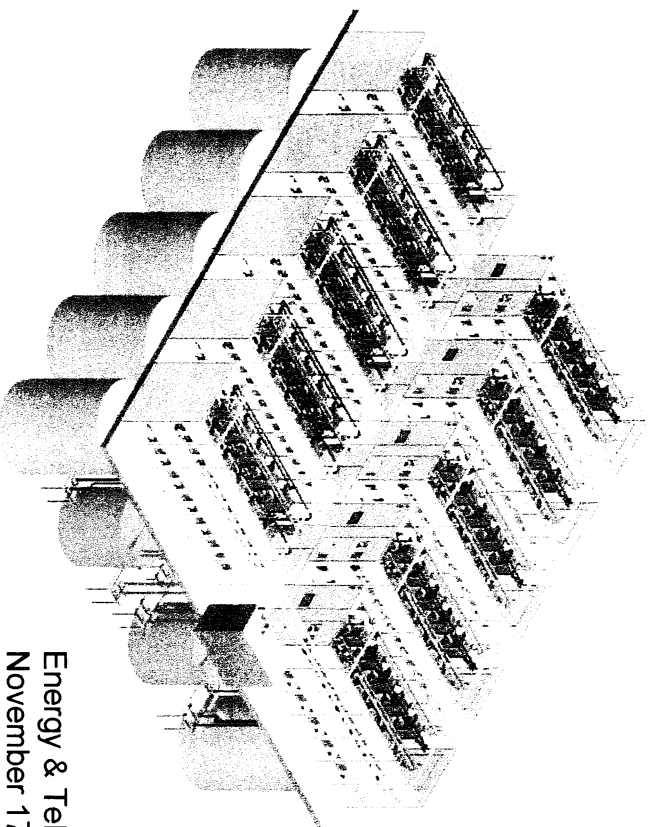


Energy Storage Systems

The Leader in Global Grid Scale Energy Storage Systems

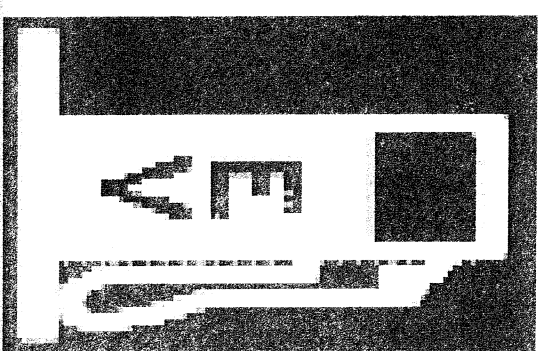
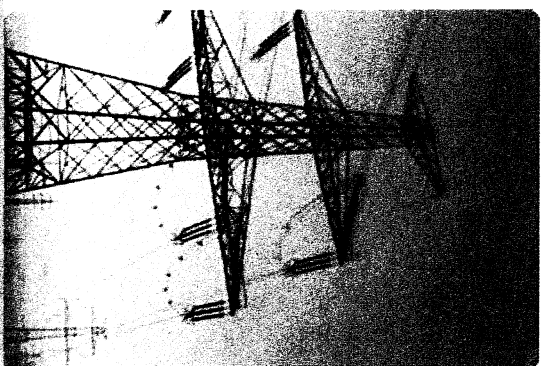
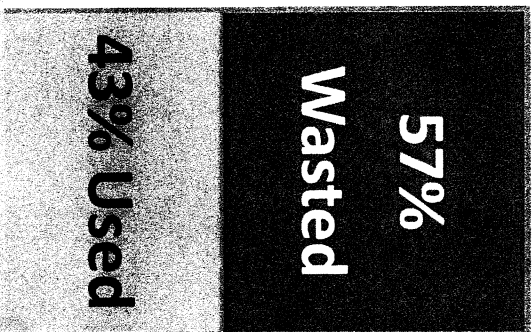
- **5 kW for 8 Hours**
- **40 kWh, 20 Years**
- **Self Contained**
- **24 Square Feet**
- **Launch 2011**



- **1 MW for 8 Hours**
- **8 MWh, 20 Years**
- **Complete System**
- **5,000 Square Feet**
- **Launch 2012**

Energy & Telecommunications Committee
November 17, 2011

The Energy Problem in the U.S.A.



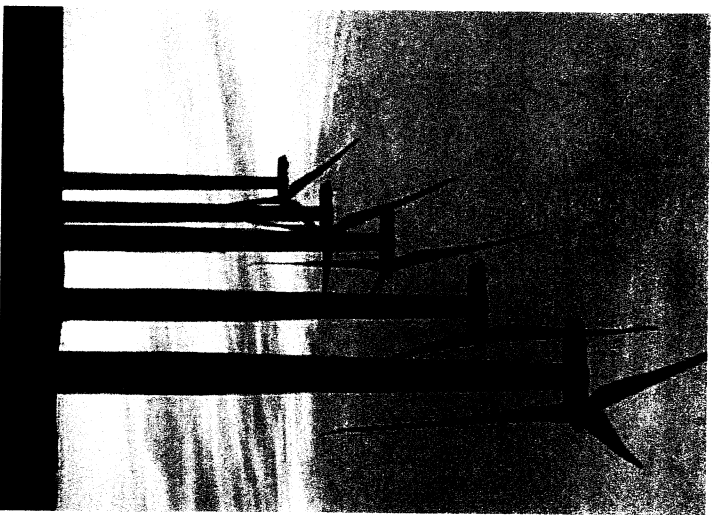
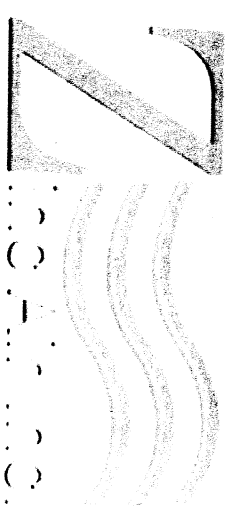
Annual Losses
Foreign Dependence

Transmission Limitations
Aging Infrastructures

Increasing Demands
Distributed Needs

To Fix the U.S.A. Energy Problem: \$7 Trillion*
(*Jefferies Report on Energy 2011)

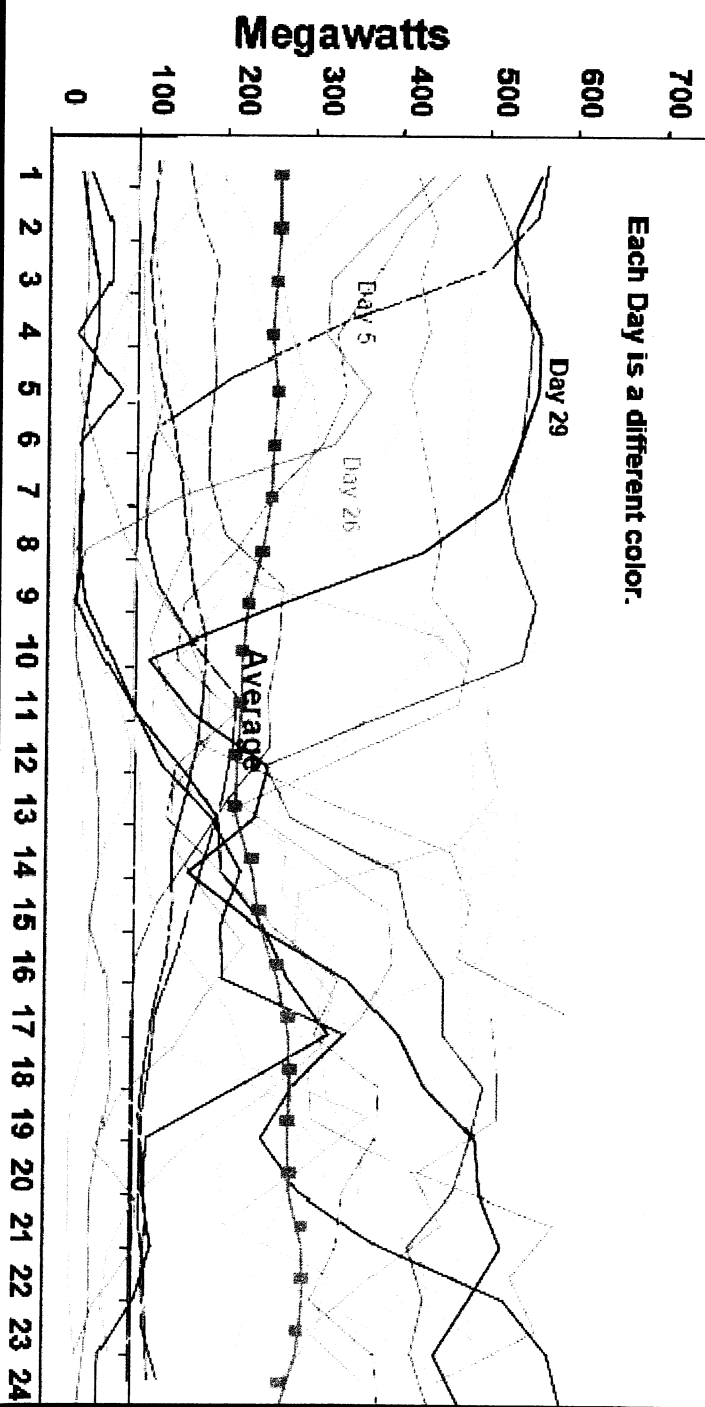
The Problem: Variability of Wind Generation



Tenaskapec Wind Generation in April – 2005

Could you predict the energy production for this wind park
either day-ahead or 5 hours in advance?

Each Day is a different color.



The Problem is Growing As Wind Energy Grows

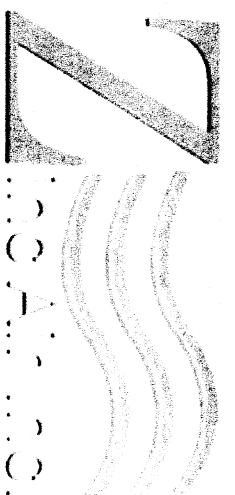
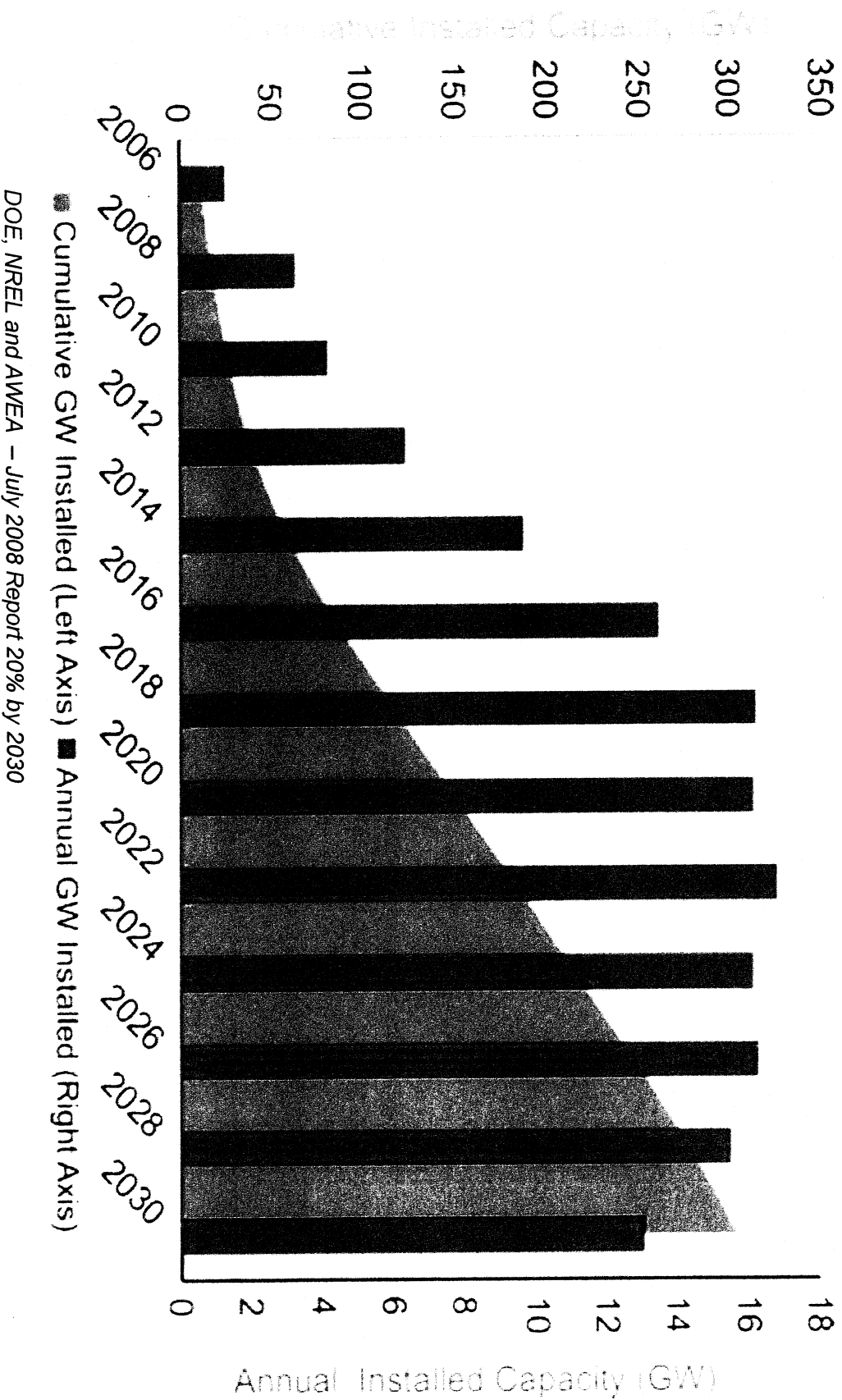
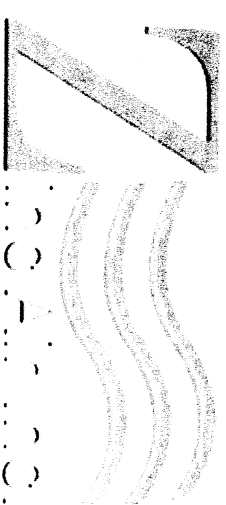


Figure 1-4. Annual and cumulative wind installations by 2030



DOE, NREL and AWEA – July 2008 Report 20% by 2030

Market Opportunity: Wind Power Load Shifting



Grid storage can address problems and add value to 4 key areas:

- Improving intermittency of renewables
- Enhancing grid reliability
- Optimizing utilization of transmission assets
- Increasing the value of renewable energy generation assets

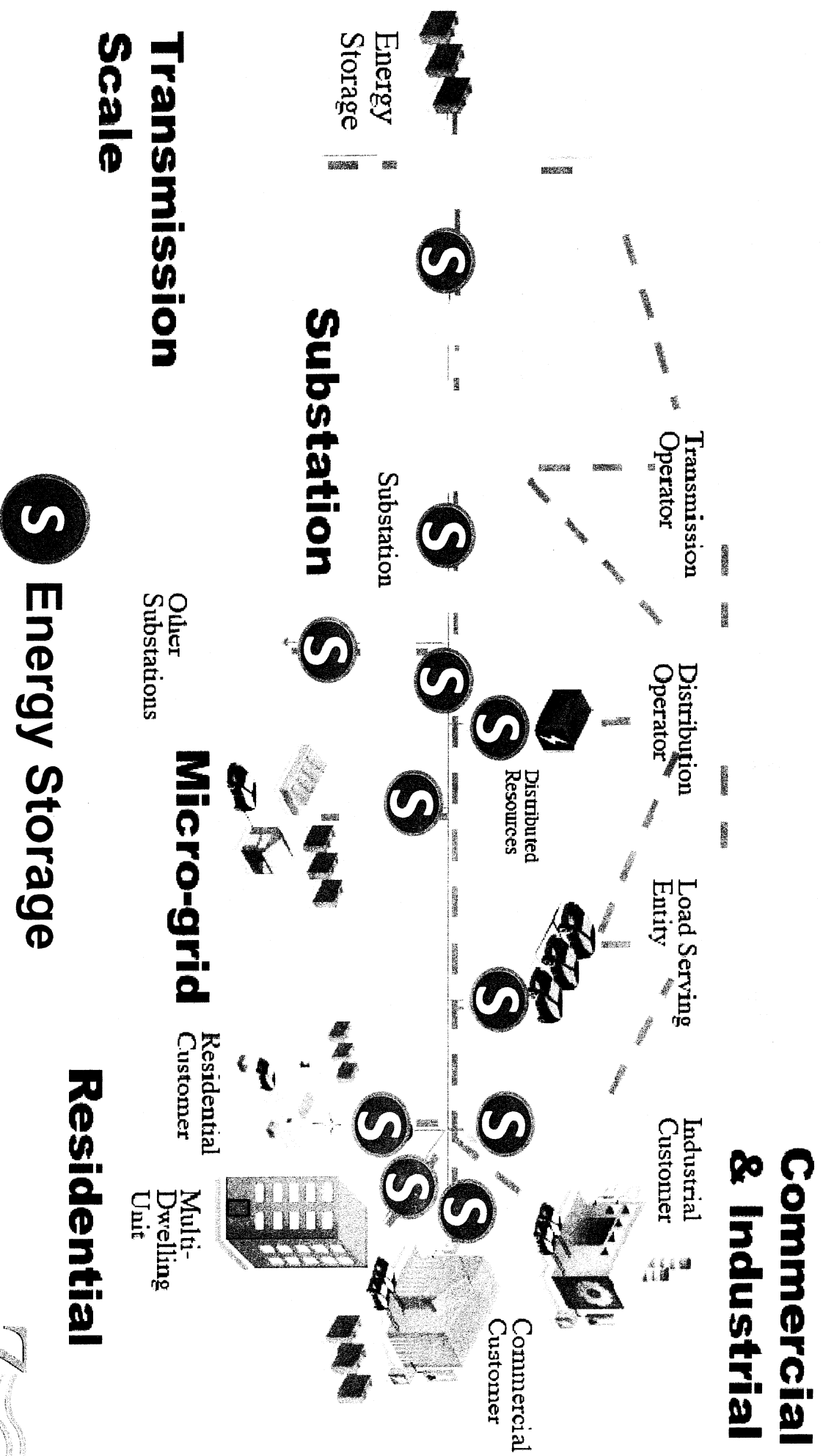
**Total Available Market (TAM) Estimated
at \$200B
(U.S. Only - DOE Estimate*)**

“Hours-to-days of power for daily energy peak shifting. For this application, power capacity on the order of 200 GW and 1,000 GW-hr would be necessary for up to 20% integration of renewables.”

Statement from ARPA-GRIDS Grant

Energy Storage Opportunities – Market Segments

Smart Grid

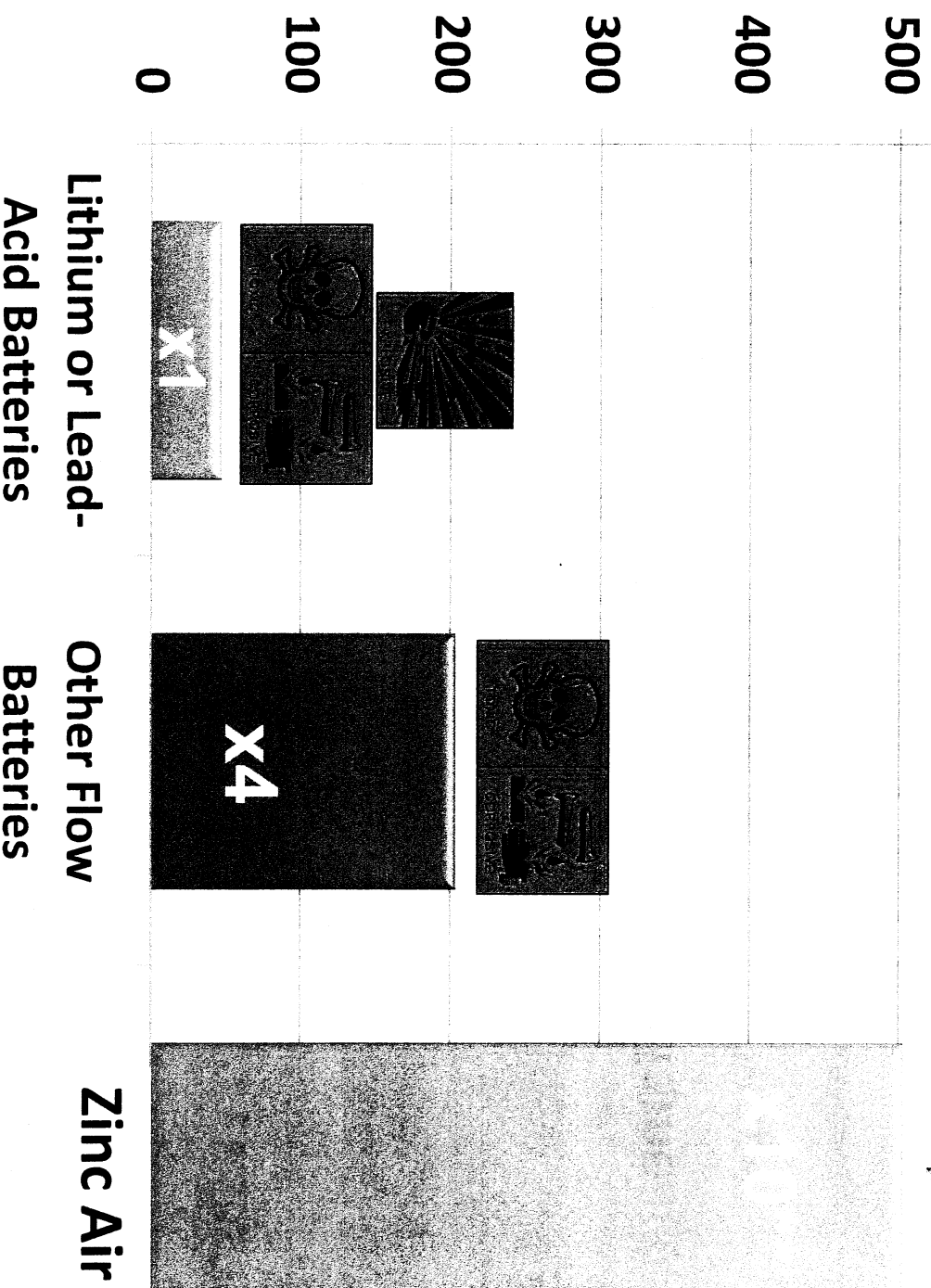


Why Flow Batteries?

Performance Comparison



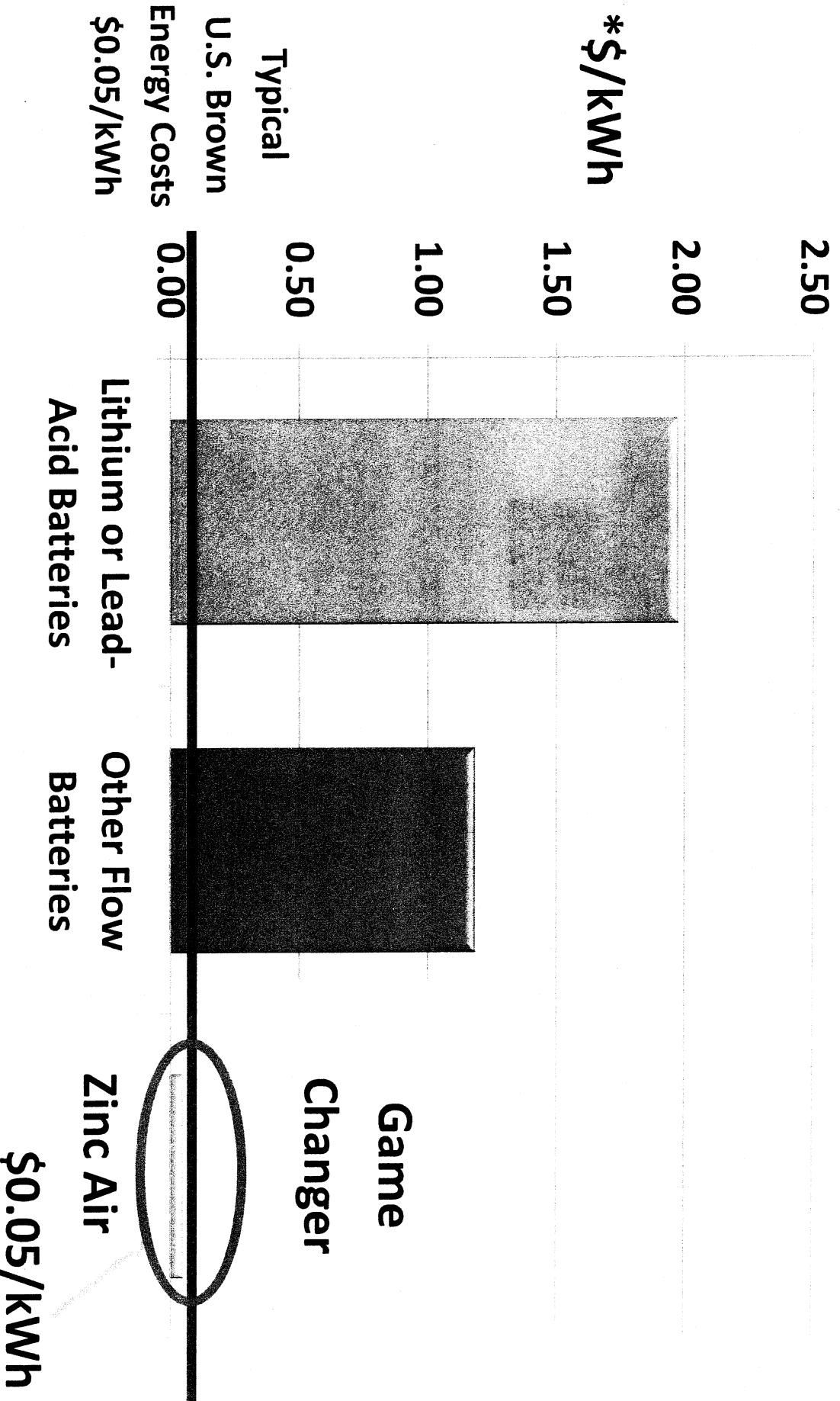
***Economic
Performance**



**x1 measured in the lab

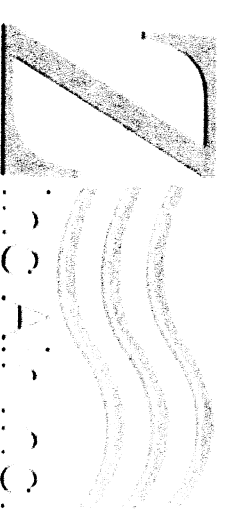
*Discharge Time x Depth of Discharge x Total Efficiency

Net Cost of Usage



* Deferred cost by net revenues of \$0.25/kWh

Zinc Redox Unique Advantages



Low Cost: Simplicity in Design & Operation

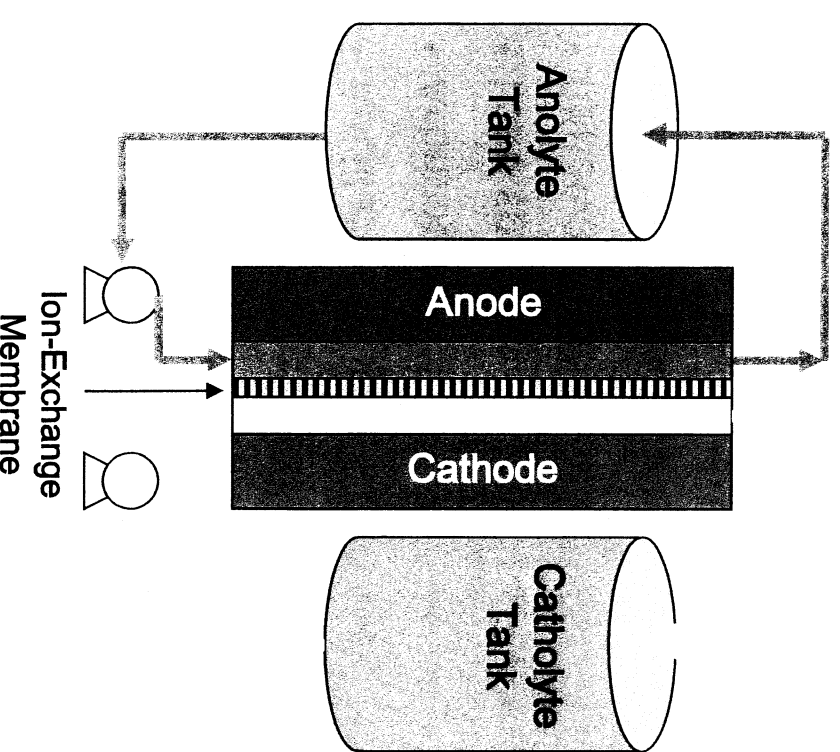
- Material selection for performance & cost
- System design is modular & scalable
- Technology maturity: +8 years

Best-in-Class Performance

- Electrochemical efficiency at +74%
- Designed for durability
- Millisecond response time

Environmentally Friendly: Safe & Green

- Safe/non-hazardous/non-toxic chemistry
- Not pressurized
- Ambient temperature



Basic Features and Applications

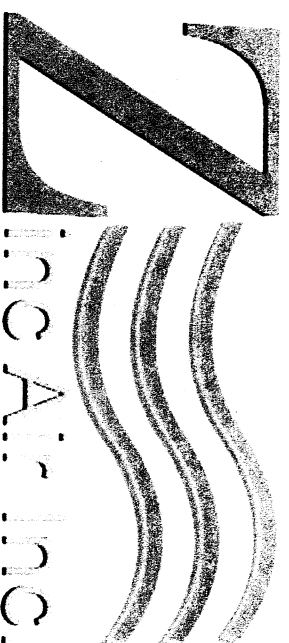
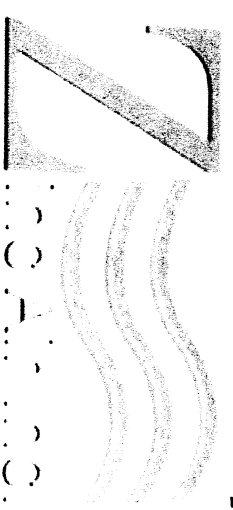
Features

- Environmentally safe system
- Long full power discharge times up to 8 hours
- Scalable from 5kW to 100 MW
- Long life and refurbishment > 20 years
- Deep discharge cycles > 95%
- Standard control interfaces to grid
- Battery control system for multiple applications
- Standard field proven components
- Multiple revenue based applications
- Short payback periods
- Round trip efficiency > 70%
- Standard ISO manufacturing
- Standard ambient temperature operating conditions
- Non-pressurized

Applications

- Islanding
- Peak shaving
- Frequency regulation
- Ancillary services
- Arbitrage
- Load shifting
- Renewables firming
- Backup power systems
- Deferral of Transmission
- Integrated systems
- VAR support
- Black start

Thank You for Your Consideration



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